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APPLICANT: Hopfensitz et al.

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- ☒ Assignment of Invention
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Hoffmann & Baron, LLP

1093-0029

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Hoffmann & Baron, LLP

1093-0029

Exhibit B

FILM PROCESSING METHOD AND DEVICE

Publication number: JP9277196
Publication date: 1997-10-28
Inventor: YAMASHITA RIKIYA
Applicant: DAINIPPON PRINTING CO LTD
Classification:
- **International:** B26F1/38; B26F1/38; (IPC1-7): B26F1/38
- **European:**
Application number: JP19960114126 19960410
Priority number(s): JP19960114126 19960410

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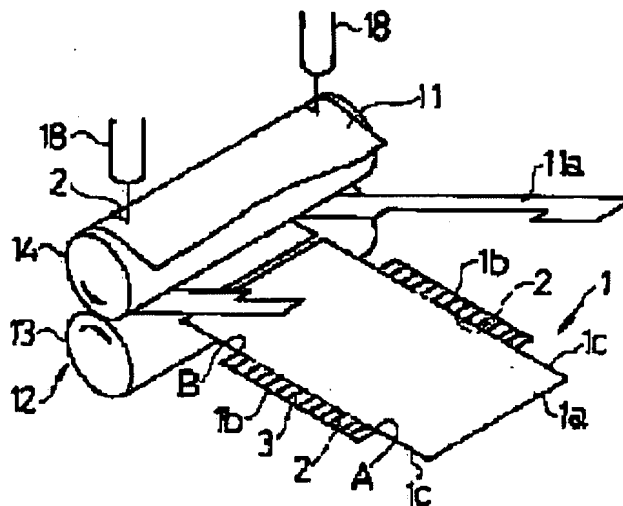
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Abstract of JP9277196

PROBLEM TO BE SOLVED: To conduct both stamping and half-cutting with high productively, accurately determining both punching position and half-cutting position to a film. **SOLUTION:** A film 11 is supplied to a female drum 14 of a rotary die cutter 12 provided with both a male drum 13 and the female drum 14 in such a manner that the film 11 is wound round the drum 14. By using a raser beam irradiating means 18, a raser beam is irradiated to the film 11 on the female drum 14 in order to form a half cut 2. Next, by using a cutting edge of the male drum 13, the film 11 is stamped into a product 1 having a shape as desired. With this, the positional accuracy of the half-cutting position to the stamping position (the external shape of the product 1) can be heightened, and moreover the productivity can be heightened as well.



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Exhibit C

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the approach and equipment for processing forming a break and half cutting to the ingredient (only henceforth a film) of the shape of a film, such as a film, a web material, paper, and a metallic foil, or piercing etc.

[0002]

[Description of the Prior Art] Half cutting is conventionally prepared in the lid of a container, and the container of a configuration of that it can open easily by tearing the half cutting is known. This half cutting formed the low cutting edge for half cutting, and while it pierced the lid to the die for usually piercing a lid from an original fabric from the original fabric, it was putting half cutting into it. However, by this approach, the depth precision of half cutting did not come out, but since highly precise processing was not able to be performed, there was a problem that it could be used only when the thickness of an original fabric is thick. Moreover, since the thickness of the original fabric itself was not uniform, there was also a problem that the depth precision of the half cutting put into an original fabric was not fixed.

[0003] Then, the technique of putting in half cutting using a laser beam is proposed by JP, 2-60575, B. The approach of an indication in this official report performs a laser beam exposure to the lid material pierced in the predetermined configuration, and puts in the score section (half cutting) of a request configuration.

[0004]

[Problem(s) to be Solved by the Invention] However, by the approach of performing a laser beam exposure to JP, 2-60575, B like a proposal to the lid material pierced in the predetermined configuration, and forming half cutting, there are a problem that workability is bad, and a problem that the location precision of half cutting is bad.

[0005] So, when forming straight-line-like half cutting, it is thought that location precision can be raised easily, raising productivity by performing a laser beam exposure for the film which is the original fabric before piercing a lid with delivery continuously, and forming half cutting. However, if a laser beam exposure was carried out and half cutting was formed, since a projection like a burr would be formed in the both sides of that half cutting, the problem that it became it is very difficult to roll round this film, and difficult to roll round the film after forming half cutting and to send to the following punching process arose. Furthermore, immediately after pinching the film in which half cutting was formed, with a nip roll When it pierces using punching dies, such as a jump slitting machine, a slitting machine, and a die set It is difficult to control the punching location to half cutting with high precision. The location precision of the half cutting in the pierced product was bad, for example, even if it was going to form so that half cutting might begin from the root of a tab in the lid equipped with the tab, half cutting also produced the problem of being in the condition of having been formed in the location [root / of a tab] shifted for a while. Naturally these problems are produced, not only the case of the half cutting formation by laser beam exposure but when forming a cut which puts a break into a film by laser beam exposure.

[0006] In view of this trouble, it succeeded in this invention, it can perform processings (half cutting, break formation, etc.) by punching and laser beam exposure with sufficient productivity, and aims at offering the possible film processing approach and the equipment of making high relative location

precision of the punching location and a laser beam processing location moreover.

[0007]

[Means for Solving the Problem] This invention is constituted so that it may be made to run a film in accordance with a predetermined path, and may be processed by piercing by the rotary die cutter by the middle and processing by laser beam exposure may be performed, in order to solve the above-mentioned trouble. By this configuration, the location precision of a punching location and a laser beam processing location can be kept highly precise, since especially a rotary die cutter performs the complete clamp and cut to a film to coincidence mostly, a location gap hardly arises at the time of a cut, and it can perform punching and laser beam processing with sufficient productivity at it.

[0008]

[Embodiment of the Invention] The processing approach of this invention shown in claim 1 is characterized by making it run a film in accordance with a predetermined path, and processing it by piercing on said film by the rotary die cutter prepared in the path while performing laser beam processing to said film with the laser beam exposure means formed in the path. By considering as this configuration, while piercing by it becoming unnecessary to roll round the film which performed laser beam processing, and moreover performing laser beam processing and punching to coincidence in succession and raising the location precision of a location and a laser beam processing location, productivity can be raised.

[0009] Here, any of the upstream of the punching point by the rotary die cutter and a lower stream of a river are sufficient, preferably, the location which performs a laser beam exposure has the good location of in front of a punching point or an immediately after, and it is still better also as a configuration to which the exposure section of a laser beam is arranged inside a rotary die cutter, and a laser beam exposure is carried out at a punching point. Moreover, to a film, the exposure section of a laser beam may be irradiated from the direction of throats, such as a horizontal and slant, a top and the bottom, and may choose the direction of radiation as arbitration through a mirror further.

Although processing which forms half cutting to a film as laser beam processing by the laser beam exposure means is desirable, you may be processing which forms the break penetrated not only on this processing but on the film. Although punching processing by the rotary die cutter means processing usually completely pierced in the configuration of each product (for example, lid) from a film, or processing pierced in the configuration where each product stood in a row, it does not restrict in this case but processing which pierces things other than a product is also included like [in the case of piercing the notch for tear initiation]. The film made into the object of this invention is arbitrary if half cutting, a break, etc. can be formed by laser beam exposure, for example, when monolayer films, such as resin and paper, and a laminated film can be mentioned and it forms half cutting especially, since it can carry out half cutting of the laminated film which contains metal layers, such as aluminum foil and aluminum vacuum evaporation, as an internal layer to the fixed depth to the location of a metal layer by carrying out the laser beam exposure of the layer of one side of a metal layer, it is desirable. Moreover, the thickness of a film is also arbitrary and punching should be just possible at a rotary die cutter. As laser beam processing, it is the break penetrated on the film [0010] The rotary die cutter which invention of claim 3 is film processing equipment for enforcing the above-mentioned film processing approach, and was equipped with **** which collaborates with **** equipped with the cutting edge for processing it by piercing on a film, and its ****, It is characterized by having a film guidance means to show around so that a film may be twisted around a part of peripheral face of **** of the rotary die cutter, and the laser beam exposure means arranged so that a laser beam may be irradiated at the film twisted around the ****. Since laser beam processing of the half cutting formation by laser beam exposure etc. and punching processing by **** are performed to the film held on **** of a rotary die cutter according to this configuration, while a film pierces from the point irradiating [laser beam] and moves to a point, shifting to a longitudinal direction does not have *****, for this reason, it can be pierced with a laser beam processing location, and can position a location very with high precision. Moreover, since a laser beam exposure is carried out to the film held at ****, the distance from a laser beam exposure means to a film is always kept constant, and the depth can be made very uniform in case half cutting is formed.

[0011] The rotary die cutter which is film processing equipment for invention of claim 4 to also

enforce the above-mentioned film processing approach, and was equipped with **** which collaborates with **** equipped with the cutting edge for processing it by piercing on a film, and its ****, Contiguity arrangement is carried out at the rotary die cutter, and it is characterized by having the support roller conveyed where a film is twisted around a part of peripheral face, and the laser beam exposure means arranged so that a laser beam may be irradiated at the film twisted around the support roller. Meandering which will be produced by the time the film into which half cutting etc. was processed by laser beam exposure reaches the punching point of a rotary die cutter since it is that near according to this configuration, although the point irradiating [laser beam] is the location where rotary die cutters differ is very small, it can pierce with formation locations, such as half cutting, too, and a location can be positioned very with high precision. Moreover, since a laser beam exposure is carried out to the film held at the support roller, the distance from a laser beam exposure means to a film is always kept constant also in this case, and the half cutting depth can be made very uniform.

[0012]

[Example] Hereafter, the suitable example of this invention is explained. The product which drawing 1 manufactured the outline side elevation of the film processing equipment by one example of this invention and drawing 2 by the outline perspective view of the film processing equipment, and manufactured drawing 3 with the film processing equipment is shown. It is the product which 1 pierced the film in drawing 3 (a), and was made, and while being for packing a roll sheet, it serves as the lead tape for pulling out the tip of the packed roll sheet, and a packing material is called below. This packing material 1 has central partial 1a and lobe part 1b of edges on both sides of constant width, and projects with central partial 1a, and half cutting 2 is formed in the boundary of partial 1b, i.e., the production top of edges-on-both-sides 1c of central partial 1a. Moreover, the break 3 for insertion of a large number is formed in the longitudinal direction at lobe part 1b. Drawing 3 (b) shows the condition of having packed the roll sheet by this packing material 1, the edge inside central partial 1a of a packing material 1 is connected at the tip of an internal roll sheet, the edge of the outside of a packing material 1 is stuck on the external surface of the packing material 1 located in the bottom of it on a tape 4, and is fixed, and lobe part 1b of both ends is folded up by the roll paper end side. In order to open this packing material 1, lobe part 1b currently folded up to the roll paper end side can be separated using half cutting 2, and, thereby, the tip of the roll sheet connected to the back end of that central partial 1a can be pulled out that what is necessary is just to pull out central partial 1a which subsequently tore the tape 4 and had covered the periphery of a roll sheet.

[0013] In drawing 1 and drawing 2, the film with which an original fabric roll 10, and 12 are the rotary die cutters for piercing a film 11 in the configuration of a packing material 1, and are equipped with **** 14 which collaborates with **** 13 equipped with cutting-edge 13a for piercing a film in a predetermined configuration; and its **** 13. Cutting-edge 13a prepared in **** 13 is the configuration which it not only pierces a film 12 in the configuration of a packing material 1, but can form a break 3. **** 14 is usually good also as a drum which had a female blade or a crevice if needed, although a front face is a smooth drum. The guide idler which constitutes a film guidance means to show around as a film 11 twisted around a part of peripheral face of **** 14 of the rotary die cutter 12 in 16, and 18 are laser beam exposure means arranged so that a laser beam may be irradiated at the film 11 twisted around **** 14. This laser beam exposure means 18 is for forming half cutting 2 in a packing material 1. As a laser beam exposure means 18, if half cutting can be formed in a film 11 by laser beam exposure, in the thing of arbitration, it will be usable and carbon dioxide gas laser will usually be used to a resin film. Moreover, depending on the quality of the material of a film, an YAG laser, excimer laser, wavelength adjustable die laser, etc. may be used. Furthermore, fixed or working is sufficient as these laser beam exposure means 18.

[0014] The tray which accumulates the packing material 1 by which 20 was pierced by the rotary die cutter 12, and 22 are surplus-material winding means which roll round surplus-material 11a after piercing a packing material 1 from a film 11. In addition, you may make it discharge surplus-material 11a not only when rolling round, but to a waste box. Furthermore, you may make it cut surplus-material 11a with a die roll in the case of this discharge.

[0015] Next, actuation by the processing equipment of the above-mentioned configuration is

explained. A film 11 is pulled out from the original fabric roll 10, it passes through the bottom of the laser beam exposure means 18 in the condition of having been twisted around **** 14 of the rotary die cutter 12, and a laser beam exposure is carried out and half cutting 2 is formed. Then, a film 12 is sent in the condition of having been held at the peripheral face of **** 14 at a point of contact (punching point) with **** 13, and it is pierced by the packing material 1 of a predetermined configuration, and the packing material 1 is discharged on a tray 20, and surplus-material 11a after piercing is rolled round with the surplus-material winding means 22. The packing material 1 of the predetermined configuration equipped with half cutting 2 as mentioned above is manufactured. In addition, half cutting 2 is formed in the inferior surface of tongue of the packing material 1 accumulated by the tray 20 in this example.

[0016] Here, since the laser beam exposure of the film 11 is carried out by the laser beam exposure means 18 in the condition of having been held at the peripheral face of **** 14 and half cutting 2 is formed, the distance from the laser beam exposure means 18 of a film 11 is kept constant during the laser beam exposure, and, for this reason, the half cutting 2 of the uniform depth is formed. Moreover, since it is conveyed and pierced in the condition of having been held on the peripheral face of **** 14 till a point of contact with **** 13, while a film 11 pierces from the point irradiating [laser beam] and moves to a point, a film 12 does not shift to a longitudinal direction, and for this reason, the film 11 after half cutting 2 was formed can be pierced with the formation location of the half cutting 2 on a film 11, and can position a location very with high precision. That is, edges-on-both-sides 1c of central partial 1a of the packing material 1 pierced by the rotary die cutter 12 can be made to adjust correctly the location of the half cutting 2 formed by laser beam exposure in drawing 2.

[0017] In addition, what is necessary is for there to be not necessarily no need of always performing the laser beam exposure during transit of a film 12, and just to perform the laser beam exposure, while during the A point shown in drawing 2 and a B point passes at least since the laser beam exposure means 18 should just form half cutting 2 in a packing material 1 at the time of the above-mentioned processing. Moreover, although the strength of a laser beam presupposes that it is usually fixed and the half cutting 2 of the fixed depth is formed, you may make it open the hole which enlarged reinforcement temporarily and was penetrated if needed. For example, the hole penetrated mostly at the A point and the B point can be opened by increasing the reinforcement of a laser beam exposure in the both-ends location of half cutting 2, i.e., an A point, and a B point. Thus, the advantage from which the activity which projects since these will tear and it will become a start point, if the hole is opened at the A point and the B point, and cuts off partial 1b becomes easy is acquired.

[0018] Furthermore, after piercing this invention not only in this configuration, you may make it send it to degree process with conveyance means, such as a suitable conveyor, immediately, although the pierced packing material 1 is accumulated on the tray 20 with the equipment of the above-mentioned example. Furthermore, a packing material 1 is not pierced completely, but it pierces in the form where the packing material 1 stood in a row, and you may make it send to degree process as it is.

[0019] Drawing 4 is the outline side elevation showing other examples of this invention. In this example, on **** 14 of the rotary die cutter 12, the support roller 25 was formed so that it might be pushed against that **** 14, it showed around so that a film 11 might be twisted around that support roller 25 by the guide idler 16, and the laser beam exposure means 18 is arranged so that a laser beam may be irradiated at the film 11 twisted around that support roller 25. In this example, the laser beam exposure was performed on the film 11 supported by the peripheral face of the support roller 25, half cutting was formed, that film 11 was moved from the support roller 25 to **** 14 of the rotary die cutter 12, and it has pierced in the point of contact of **** 14 and **** 13. For this reason, while the film 11 which had half cutting formed will be moved to the peripheral face of **** 14 after having been supported by the peripheral face of the support roller 25, it pierces from the point irradiating [laser beam] and is conveyed to a point by laser beam exposure, it is always supported by the support roller 25 or the peripheral face of **** 14, and does not shift to a longitudinal direction. Therefore, like the case where it is shown in drawing 1, it can pierce with the location of half cutting and location precision with a location can be kept high. In the example of

drawing 4, unlike the example of drawing 1, it becomes possible to arrange the original fabric roll 10 on the left-hand side of the rotary die cutter 12, and it becomes possible to form half cutting in the top-face side of the packing material 1 accumulated by the tray 20.

[0020] In addition, although considered as the configuration which pushed the support roller 25 against **** 14 of the rotary die cutter 12 in the example of drawing 4, as shown in drawing 5, it is good also as a configuration which separates the support roller 25 from **** 14 for a while. In this case, if this distance is short set up although it will pass through the air in case a film 11 moves to **** 14 from the support roller 25, it can restrict very small a film 11 moving in a zigzag direction, and shifting to a longitudinal direction, and can pierce with the location of half cutting, and location precision with a location can be too kept high.

[0021] Furthermore, when using the support roller 25, deforming, as shown in drawing 6 is also possible. That is, in drawing 6, the support roller 25 has been arranged before the rotary die cutter 12, the laser beam exposure was carried out with the laser beam exposure means 18, half cutting was formed in the film 11 which passes through the support roller 25 top, the film 11 was sent to the punching point of the direct rotary die cutter 12, and it has pierced in the predetermined configuration. Also in this case, by shortening distance after a film 11 leaves the support roller 25 until it reaches the punching point of the rotary die cutter 12, meandering of a film 11 can be suppressed very small, it can pierce with the location of half cutting, and location precision with a location can be too kept high. In order to suppress meandering of the film 11 which left the support roller 25 in the case of drawing 5 and drawing 6, it is desirable to shorten film die length which passes through the air between the support roller 25 and the rotary die cutter 12 as much as possible, for example, it is desirable to make it 1m or less especially at 50cm or less. Moreover, since preparing the clamp transport device which holds and conveys the edges on both sides of a film 11 between the support roller 25 and the rotary die cutter 12 can also prevent meandering, it is desirable.

[0022] In the above example, although the laser beam exposure is performed in the upstream of the punching point by the rotary die cutter 12, this invention is not only this configuration but the downstream, or may be pierced, simultaneously may perform a laser beam exposure. Drawing 7 shows the example in the case of performing a laser beam exposure on the lower stream of a river of a punching point. Although **** 14A of **** 13 equipped with cutting-edge 13a and a smooth front face is used for it, the rotary die cutter 12 used in this example has formed the vacuum adsorption means in this **** 14A, crosses the pierced packing material 1 to the range of about 180 degrees, and carries out adsorption maintenance. And the laser beam exposure means 18 is arranged in the location which can perform a laser beam exposure to the packing material 1 by which adsorption maintenance is carried out at the **** 14A. In this example, after piercing a film 11 in a predetermined configuration, **** 14A carries out adsorption maintenance, and conveys the pierced packing material 1, the laser beam exposure means 18 carries out a laser beam exposure by that middle, half cutting is formed, and half cutting can be formed in the position to the pierced packing material 1 with high degree of accuracy.

[0023] Drawing 8 shows the example which pierces, simultaneously performs a laser beam exposure. In this example, while making **** 14B hollow and forming a slit 30 in the part on a periphery, laser beam exposure section 18a of a laser beam exposure means is arranged in that **** 14B, and the laser beam exposure is performed on the film 11 in the point of performing punching by the rotary die cutter 12. Thereby, it can pierce with a half cutting location and a location can be aligned very with high precision.

[0024] Although the width of face of a film 11 is set up more widely than the packing material 1 used as a product and he is trying to remain in both sides as surplus-material 12a in each above example at the time of punching of a packing material 1 so that drawing 2 may show well, the width of face of a film 11 may be set up almost equally to the width of face of a packing material 1, and removal (side slit) of film edges on both sides may be omitted. Moreover, when the continuous film is used and it is necessary to roll round the film into which half cutting was put by the laser beam exposure, it is good also as a configuration which rolls round spirally and lessens effect of the projection in the weld flash at the time of half cutting. Moreover, although the above-mentioned example shows what is pulled out from the original fabric roll 10 as a film 11, this invention may use

the film of not only when using such a continuous film, but a sheet. What is necessary is just to prepare the presser-foot roller or the presser-foot belt with the gestalt forced on **** 14 so that the tip of each film can be forced and twisted around **** 14 when using the film of a sheet (for example, as shown in drawing 1 when twisting the film of the sheet around **** 14 and carrying out a laser beam exposure).

[0025] Furthermore, although the above-mentioned example explained the case where the packing material 1 shown in drawing 3 was manufactured, the product to manufacture can be changed not only in this packing material 1 but variously. This invention explains some examples of the target product below.

[0026] Drawing 9 (a) shows the suitable lid material 32 to use it for the container which holds coffee and fish flour. This lid material 32 has the half cutting 2 which begins from tab 32a and its root, by gathering and pulling tab 32a, can be torn along with half cutting 2, and can open a part. In order to manufacture this lid material 32, as shown in drawing 9 (b), half cutting 2 can be formed in a film 11 by laser beam exposure, and the lid material 32 which has the half cutting 2 correctly positioned at the root of tab 32a by this actuation that what is necessary is just to pierce as lid material 32 by the rotary die cutter can be formed.

[0027] Drawing 10 (a) shows the method seal bag 34 of four which formed seal section 34a in four sides, and it forms in one side in a bag the half cutting 2 prolonged from the tip of a notch 35 while it is torn into this method seal bag 34 of four at a side edge and forms the notch 35 of business. After folding the continuous film 11 in half and forming seal section of three sides 34a in the continuation manufacture charging line of the method seal bag of four as shown in drawing 10 (b) in order to manufacture this method seal bag 34 of four And in front of the location (not shown) which separates into each method seal bag 34 of four, and is filled up with contents The roller which supports a laser beam exposure means 18 to carry out a laser beam exposure and to form half cutting 2 in the film 11, and the tooth back of the film 11 of a location by which a laser beam exposure is carried out (not shown), What is necessary is to arrange the rotary die cutter 12 equipped with **** 13 and **** for piercing a notch 35, and to form half cutting 2 in a film 11 by laser beam exposure, and just to pierce a notch 35 by the rotary die cutter 12. By this actuation, processing which doubled the location of half cutting 2 and a notch 35 correctly can be performed. In addition, the continuation production line of this method seal bag of four Horizontal-type bag manufacture Rhine or vertical mold bag manufacture Rhine is sufficient, and when it applies to this invention in horizontal-type bag manufacture Rhine, the rotary die cutter 12 is arranged horizontally. When the laser beam exposure means 18 becomes the gestalt which irradiates a laser beam perpendicularly and it applies to this invention in vertical mold bag manufacture Rhine, the rotary die cutter 12 is arranged perpendicularly and the laser beam exposure means 18 serves as a gestalt which irradiates a laser beam horizontally.

[0028] Drawing 11 (a) shows the tamper resist label 40 for [of a container 37] opening and closing opening 38. This tamper resist label 40 has two half cutting 2 for tearing. Drawing 11 (b) and (c) show the film processing equipment for manufacturing this tamper resist label 40. In the case of this example, the film 41 of the gestalt which stuck label 41b all over release paper 41a is supplied to **** 14 of the rotary die cutter 12, half cutting 2 is formed by the laser beam exposure by the laser beam exposure means 18 on it, after that, only label 41b is pierced by island shape by the rotary die cutter 12, and the product of the gestalt which left the tamper resist label 40 on release paper 41a can be manufactured.

[0029] In each above example, the range whose optical outputs thickness is 5-50W to a less than 3-250-micrometer resin film is used suitably that what is necessary is just to set suitably according to a presentation and thickness of an ingredient, the depth, width of face of half cutting to be used and which should be formed, etc. as exposure conditions for the laser beam in the carbon dioxide gas laser at the time of forming half cutting 2. Moreover, to the resin sheet whose thickness is 250 micrometers - 3mm, the range whose optical outputs are 5-500W is used suitably. Generally, as for the wavelength of a laser beam, the range of 10.5-10.7 micrometers is used. The range of 0.5-6mm is used, and, as for the beam diameter of a laser beam, the range of 2.5-4.5mm is used preferably. When using die laser, the wavelength of the laser beam suitable for a film property can be used.

[0030]

[Effect of the Invention] this invention approach makes it run a film in accordance with a predetermined path so that clearly from the above explanation. By having considered as the configuration of processing it by piercing on said film by the rotary die cutter prepared in the path while performing laser beam processing to said film with the laser beam exposure means formed in the path Since location precision of the punching location and laser beam processing location to a film can be made very high, it moreover pierces with a laser beam processing formation process and a process can be carried out continuously, it has the effectiveness that productivity can be raised. When forming half cutting as laser beam processing especially, the effectiveness that the half cutting of the fixed depth can be formed easily is acquired.

[0031] The rotary die cutter equipped with **** which collaborates with **** equipped with the cutting edge for processing it by piercing on a film this invention equipment shown in claim 3, and its ****, By having considered as the configuration which has a film guidance means to show around so that a film may be twisted around **** of the rotary die cutter, and the laser beam exposure means arranged so that a laser beam may be irradiated at the film twisted around said **** Laser beam processing of the half cutting formation by laser beam exposure etc. and punching processing by **** can be performed to the film held on **** of a rotary die cutter. This sake, While a film pierces from the point irradiating [laser beam] and moves to a point, that a film shifts to a longitudinal direction does not have *****, and it pierces with a laser beam processing location, and has the effectiveness that a location can be positioned very with high precision.

[0032] Moreover, the rotary die cutter equipped with **** which collaborates with **** equipped with the cutting edge for processing it by piercing on a film this invention equipment shown in claim 4, and its ****, The support roller conveyed where contiguity arrangement was carried out at the rotary die cutter and a film is twisted around a part of peripheral face, Although the point irradiating [laser beam] is the location distant from the rotary die cutter by having considered as the configuration which has the laser beam exposure means arranged so that a laser beam may be irradiated at the film twisted around the support roller Meandering which will be produced by the time the film to which laser beam processing of half cutting formation etc. was performed by laser beam exposure pierces and it reaches a point, since it is the near is very small. It has the effectiveness that it can pierce with the formation location of laser beam processing, and a location can be positioned very with high precision too.

[Translation done.]

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CLAIMS

[Claim(s)]

[Claim 1] The film processing approach characterized by making it run a film in accordance with a predetermined path, and processing it by piercing on said film by the rotary die cutter prepared in the path while carrying out laser beam processing of said film with the laser beam exposure means formed in the path.

[Claim 2] The film processing approach according to claim 1 characterized by laser beam processing by said laser beam exposure means being processing which puts half cutting into said film.

[Claim 3] Film processing equipment which has the rotary die cutter equipped with **** which collaborates with **** equipped with the cutting edge for processing it by piercing on a film, and its ****, a film guidance means to show around so that a film may be twisted around a part of peripheral face of **** of the rotary die cutter, and the laser beam exposure means arranged so that a laser beam may be irradiated at the film twisted around said ****.

[Claim 4] Film processing equipment which has the rotary die cutter equipped with **** which collaborates with **** equipped with the cutting edge for processing it by piercing on a film, and its ****, the support roller conveyed where contiguity arrangement was carried out at the rotary die cutter and a film is twisted around a part of peripheral face, and the laser beam exposure means arranged so that a laser beam may be irradiated at the film twisted around the support roller.

[Translation done.]